

Date: December 18, 2012

To: Thomas J. Bonfield, City Manager
Through: Keith Chadwell, Deputy City Manager
From: Marvin G. Williams, Public Works Director
Subject: Contract with Biohabitats, Inc. for a Feasibility Study of Algal Turf Scrubber™ Nutrient Removal in the Falls Lake Watershed

Executive Summary

The Falls Lake Nutrient Management Strategy requires large reductions of nitrogen and phosphorus (i.e., nutrients) from the City of Durham. The existing rules provide direction for structural stormwater control measures to be installed to mitigate nitrogen and phosphorus from new development, existing development and agricultural land uses. Stormwater & GIS Services has identified two nutrient removal technologies that have the potential to remove nitrogen and phosphorus at a lower cost per pound. A previous agenda item addressed the first technology: the AquaLutions™ nutrient removal system. This project would direct Biohabitats to conduct a feasibility study for the second technology: the Algal Turf Scrubber™. The Algae Turf Scrubber™ system is a patented algae growth and harvesting system that can be sized to fit the available land and water volume. The Algal Turf Scrubber™ has been used to treat both stormwater and wastewater. The Administration recommends that the City Council authorize the City Manager to execute a contract for a feasibility study with Biohabitats.

Recommendation

The Administration recommends that the City Council:

1. Authorize the City Manager to execute a contract with Biohabitats, Inc. for a feasibility study and pilot study design for an Algal Turf Scrubber™ nutrient removal system in the amount of \$52,470.00;
2. Establish a contingency in the amount of \$5,330; and,
3. Authorize the City Manager to executed amendments to the contract, as long as the total contract amount, including amendments, does not exceed \$57,800.00.

Background

The Falls Lake Nutrient Management Strategy rules went into effect in January of 2011. To reduce the amount of algae/chlorophyll *a* in the lake, these rules require extensive reductions to nutrients entering Falls Lake from the City of Durham and other watershed jurisdictions in the watershed. The ultimate required reductions from the nutrient loads delivered to the lake in 2006 are 40 percent less nitrogen and 77 percent less phosphorus. There are three different parts of the nutrient strategy rules that address nutrients in stormwater runoff, as follows: the new development rule (15A NCAC 02B .0277), the existing development rule (15A NCAC 02B .0278), and the agriculture rule (15A NCAC 02B .0280). Projected costs to comply with the existing development portion of the rules were estimated in 2010 by

Stormwater Services to be \$595 to \$645 million dollars to achieve a ten percent nitrogen reduction and 20 percent phosphorus reduction. Therefore, a larger cost is expected in order to comply with the mandated reductions.

The new development, existing development and agriculture rules require the construction of structural stormwater control measures to achieve the nutrient reductions. The proposed South Ellerbe Creek wetland at the former Duke Diet and Fitness Center location is an example of the type of measure the rules direct. Other methods of controlling nutrient loads or treating lakes are available and are used throughout the country. While many of these methods have not been used in North Carolina, they can provide equal or better nutrient removal at a lower cost than land management activities. Stormwater Services investigated several of these methods and has identified two that merit detailed evaluation: the use of an AquaLutions™ system and an Algal Turf Scrubber™. Both of these technologies are in use in the State of Florida.

The Algal Turf Scrubber™ is comprised of a sloped geomembrane floway with an attachment screen that cultivates naturally occurring algae. Water can be pumped from a stream, lake or treatment plant and pulsed across the floway. As water travels down the floway, the “algal turf” or dense mats of algae remove nitrogen and phosphorus as they grow, and also filter other pollutants in the water. The treated and filtered water is returned to the original body of water further downstream of the water intake location. The algal biomass is regularly harvested so that it can be converted into a reusable byproduct, such as compost, livestock feed, garden container media, or biofuels. (See attached photographs) Algae Turf Scrubbers™ are in operation in New York, Texas, and Florida. Additional pilot studies are underway in Florida, Pennsylvania, and Maryland. Nitrogen removal rates of 13 to 38% and phosphorus removal rates up to 60% have been reported using Algal Turf Scrubbers™. As an addition to implementing traditional stormwater control measures, this technology may address a significant portion of the Falls Lake reduction requirements.

A Request for Proposals was posted on the City of Durham’s website from August 16, 2012 through September 17, 2012. Three proposals were received. A committee of six people reviewed and scored the proposals. The proposal submitted by Biohabitats was selected to fund for the feasibility portion of this work.

Alternatives

The alternative is to deny authorization to negotiate and execute the professional services contract.

Financial Impact

The City of Durham will pay Biohabitats \$52,470.00, with a contingency of \$5,330.00, resulting in a total potential, not to exceed amount of \$57,800.00 from the Public Works Capital Improvement Plan project budget (Organization code 4300L045, Object codes 725000 and 731900, Project code LK109).

SDBE Summary

The Equal Opportunity/Equity Assurance Department reviewed the Request for Proposals and all proposals received to ensure compliance with the Ordinance to Promote Equal Business Opportunities in City Contracting. There were no SBDE goals for this project. The SBDE report is provided as an attachment.

Attachments

Algal Turf Scrubber™ Photos
Copy of Draft Contract
SDBE Summary Report